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# Are Apes' Responses to Pointing Gestures Intentional?

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## ABSTRACT

This paper examines the meaningfulness of pointing in great apes. We appeal to Hannah Ginsborg's conception of primitive normativity, which provides an adequate criterion for establishing whether a response is meaningful, and we attempt to make room for a conception according to which there is no fundamental difference between the responses of human infants and those of other great apes to pointing gestures. This conception is an alternative to Tomasello's view that pointing gestures and reactions to them reveal a fundamental difference between humans and other apes.

KEYWORDS: Gestures; Normativity; Intentionality; Pointing.

## 1. Introduction

In studies discussing animal cognition findings, the question of whether referentiality is present in other species is a source of controversy. We know, for example, that many animals (such as vervet monkeys, meerkats and chimpanzees, to name a few) use alarm calls in response to predators (Hollén & Radford 2009). One of the questions arising in relation to these findings is whether such calls count as genuinely referential signals. As Macedonia and Evans put it, "it may seem self-evident that an animal emitting an alarm call in

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response to an approaching raptor is communicating something about aerial predators to conspecifics. This need not be the case. Such a vocalization could, for example, be a manifestation of the fear or panic associated with the threat of predation” (1993, p. 187). Alarm cries are referential if they convey something about the environment, and they are motivational if they express the caller’s emotional state (Seyfarth & Cheney, 2003; Marler et al., 1992; Seyfarth et al., 1980; Radick, 2008). If alarm calls turn out to be *about* the environment, rather than just expressions of affective states, they may be legitimately deemed *intentional*. Intentionality is defined as “the power of minds to be about, to represent, or to stand for, things, properties and states of affairs” (Jacob, 2010). Because intentional signals are an essential part of cognitive accounts of communication, if alarm calls are intentional, they may be investigated as instances of full-blown communicative acts, roughly analogous to linguistic utterances.

Vocalizations, however, are not the only phenomena that raise questions about intentionality; they are, after all, only one kind of putatively meaningful behavior. Recently there has been a growing interest in the nature of gestures in primates (Liebal et al., 2007; Call & Tomasello, 2007). Pika and Liebal identify three characteristics of gestures in non-human primates based on recent data: first, we are dealing with “open-ended, multi-faceted gestural repertoires, including *species distinctive* and *species-indistinctive* gestures;” second, apes “use gestures as flexibly produced intentional strategies, based on key characteristics utilized in studies of intentional communication in human children;” third, apes “develop group specific traditions of gesture” (2012, p. 3). In light of these findings, we believe that an adequate investigation of intentionality in other creatures should be focused on gestures, rather than vocalizations. In fact, given that gestures seem to be richer as well as more flexible than vocalizations, it would seem that taking gestures, rather than vocalizations, as the locus of intentionality in animal signals is a more promising line of investigation. Tomasello writes:

I personally do not see how anyone can doubt that ape gestures – in all of their flexibility and sensitivity to the attention of the other – and not ape vocalizations – in all of their inflexibility and ignoring of others – are the original font from which the richness and complexities of human communication and language have flowed. (2008, p. 55)

We are sympathetic with Tomasello on this point, but we disagree on the way in which the “flexibility and sensitivity to the attention of the other”

characteristic of ape gestures is to be accounted for. In this paper, we attempt to shed more light on the question of whether gestures are referential by drawing on philosophical accounts of the nature of intentionality. We explore a more minimal account of intentionality and we show that there is room for viewing pointing gestures in apes as intentional.<sup>1</sup> Furthermore, we aim to show that the pointing gestures of prelinguistic children and apes are not necessarily different in kind. As such, we provide an account that is in disagreement with the view held by Tomasello, who is one of the most prominent defenders of the idea that there exists a robust difference between the nature of pointing in human beings and that of other apes.

## 2. A Criterion for Intentionality

An alarm call is referential if, to put it somewhat crudely, it is *about* a predator. If it turned out that alarm calls are just expressions of affective states of a particular kind, tantamount to human laughs or grunts, then they might not be *about* anything; they might lack referentiality. Questions about the referentiality of alarm calls in chimpanzees, for example, can be viewed as similar to questions about the meaning of sounds uttered by human beings. We see no reason to approach the question of the meaning of gestures in a different manner than the question of the meaning of alarm calls: vocalizations issued in response to predators and movements of the body that seem purposeful are – at least *prima facie* – equally good candidates for meaningful behavior. So it would seem that the answer to the question about the referentiality of gestures should be articulated along the same lines: a gesture is referential if it encodes “precise information *about objects and events*, independently of the speaker’s motivational state” (Marler et al., 1992, p. 66, emphasis added). An animal gesturing at an object is engaged in an intentional act if, crudely put, the gesture is *about* the object; correspondingly, an animal’s response to a gesture counts as intentional if it is a response to the information encoded in the sender’s signal. If the movements of the receiver’s body turn out to be an

<sup>1</sup> While Tomasello (2008) agrees that apes’ pointing gestures are intentional, he thinks that the kind of intentionality involved is different than the one characterizing human infants’ pointing gestures. Perhaps most importantly, what differentiates the latter from the former is that human infants point *declaratively* and not just *imperatively*. In other words, they point in order to share information about the world. A more detailed discussion of his views would go beyond the scope of this paper.

inflexible result of prior conditioning, we would be reluctant to say the response is intentional.

But how can we analyze the *aboutness* of gestures? The question is particularly challenging in the context of dealing with non-linguistic or pre-linguistic creatures, as it would seem to require an account of referentiality that does not rely on linguistic behavior. Providing such an account is certainly a challenging task; this is what led many ethologists to “be neutral about philosophical issues that are not addressed directly by empirical evidence” and to employ the notion of *functional reference*, which is meant to characterize subjects who “behave *as if* their vocalizations encode information about events in the external environment” (Evans, 1997).

Gestures are instances of behavior. Much contemporary research on cognition is based on the assumption that flexible behavior is best explained by positing mental states, which, furthermore, are usually also widely taken to be representational. Thus, it would seem that the question of whether a certain gesture is intentional amounts to asking whether there is a representational mental state behind it. This move appears to be entirely legitimate if we agree with John Searle that linguistic meaning is characterized by ‘derived’ intentionality; as he puts it, «mental states have *intrinsic* intentionality, material objects in the world that are used to represent something have *derived* intentionality. The most important form of derived intentionality is in language and there is a special name in English for this form of intentionality. It is called ‘meaning’ in one of the many senses of that word» (Searle, 1996, p. 386). Utterances would not have meaning unless creatures possessing intentional states of mind produced them. Similarly, one might claim that gestures would fail to have any meaning unless apes that use them to communicate with other apes conferred it to them. The intentionality of gestures, if present, has its source in the contents of the apes’ minds; the question of whether gestures are intentional is, ultimately, a question about mental states. Traditionally, the characteristic feature of the intentional realm is «reference to a content, direction toward an object» (Brentano, 1874/1995, p. 68). We approach the question of referentiality of gestures in apes as an instance of the philosophical question of intentionality, and in contemporary philosophical debates this question is usually tackled via the notion of *content*.<sup>2</sup> A state (event, process,

<sup>2</sup> Not everyone accepts that content is necessary for intentionality. Daniel D. Hutto (forthcoming) defends the idea of a contentless intentional attitude, and a variety of nonrepresentational views of cognition can be found in philosophy, such as Eric Schwitzgebel’s (2002) account of dispositional

etc.) is taken to be intentional if it has content. Thus, when we ask whether apes' gestures are intentional, we are asking whether the mental states behind the gestures are contentful. In order to make things simpler, we will rephrase it as the question of whether the apes' gestures, and in particular the apes' pointing gestures, have content.

Answering this question requires a criterion to delimit those states that have content from those that do not. On the one hand, it is presumably uncontroversial that a thermostat fails to have contentful states. On the other hand, we take to be a constraint on theories about intentionality that an adequate criterion should not exclude, on purely a priori grounds, non-linguistic creatures from having intentional states; it seems plausible that, at the very least, such a criterion should not essentially involve language; after all, «linguistic phenomena are guides to the presence of intentionality in ascriptions of intentionality, but they do not constitute its essence» (Crane, 1998, p. 248).

Furthermore, when attempting to answer questions about the scope of the intentional realm, we should do our best to avoid coming up with a criterion that makes a contentful state too easy to possess. This is a threat for theories that aim to provide reductive accounts of intentionality and meaning. It is not obvious that a reductionist account, namely one that explains what it is to have an intentional state in non-intentional terms<sup>3</sup> is possible. For example, we think that the criterion for intentionality articulated by Leavens et al. (2004) does not capture what it is for a mental state to be intentional or have content in the sense that we are discussing. When Leavens and colleagues write that chimps «are communicating intentionally because they require an audience to exhibit the behavior and they exhibit a coordinated pattern of gestural and visual orienting behavior that is determined by the location of both an observer and

belief and Tim Van Gelder's (1995) dynamical systems model for cognition. The notion of representation, however, is dominant in comparative cognition research, as illustrated by Sara Shettleworth's widely used textbook, where even associative learning is described as "the formation of some sort of mental connection between representations of two stimuli" (Shettleworth, 2010, p. 105). Though there are some appeals to nonrepresentational views of cognition, such as Louise Barrett's (2011) plea for animal cognition researchers to focus a bit less on representation, and a suggestive conversation between Shaun Gallagher and Daniel Povinelli (2012) about importing embodied approaches to animal cognition research, such approaches are not dominant in the field. Our remarks are premised on the representational account of cognition, in order to speak to a wider audience.

<sup>3</sup> Without appealing to intentional vocabulary.

food. Thus, these gestures are demonstrably ‘about’ specific items in their environment» (p. 55), it may seem as if many kinds of creatures or machines showing sophisticated behavior would come out as intentional, and it is not clear that they should. We think, nevertheless, that the rich empirical methods used by Leavens and colleagues are helpful in shedding light on how to properly distinguish between intentional and nonintentional creatures.

In looking for a criterion for intentionality that neither makes it so weak that mechanical or merely reflexive behaviors count, nor so strong that only linguistic behavior counts, we think that one of the standard philosophical approaches, the one that construes intentionality as governed by normativity, is promising. The claim that normativity governs the intentional realm needs to be spelled out, and there are many ways of doing it. On the one hand, normativity has been associated with correctness conditions, and it has been taken to be a characteristic of mental states themselves insofar as correctness conditions are essential to content. Peacocke (1996), for example, characterizes intentional content as having a “correctness or fulfillment condition, ... determined by whether its referents have the properties the content specifies for them” (p. 219). On the other hand, it has been claimed that in order to count as a thinking creature, one should have an understanding of error.<sup>4</sup> This has led philosophers aiming to provide a more minimal account of what it is to be in an intentional state, one that is apt to include creatures without language, to give up normativity as a necessary component of the intentional. Hans-Johann Glock, for example, writes that, “it now strikes me that linking conceptual thought exclusively to rules or normativity may be one-sided and overly intellectualist” (Glock, 2007), and gives up on viewing normativity as essential for conceptual thought.

We think that this is not the best way to proceed when faced with the challenge of making room for nonlinguistic creatures in the intentional realm while maintaining that intentionality is governed by normativity. Rather, what is needed, perhaps, is a rethinking of normativity itself. We take Hannah Ginsborg’s (2011a, 2011b) account of normativity, where normativity is taken

<sup>4</sup> Donald Davidson endorses this view. It is worth pointing out, however, that Davidson does not even consider the possibility of the existence of nonconceptual content. Thus, it is not entirely clear where he stands when it comes to the question of whether one can count non-linguistic creatures as intentional. While he argues in favor of the claim that one cannot have thoughts if one lacks language, it is not obvious that he would not be willing to construe the intentional realm as being broader than the realm of creatures that can have *conceptual* thoughts.

to provide a demarcation criterion for the intentional realm, to be very promising. Our aim in what follows is to help to explain the way in which it could be put to work in elucidating the nature of gestural communication in apes. But first, let us provide an overview of her account.

### 3. Hannah Ginsborg's Notion of Normativity

In response to Kripke's (1984) skeptical challenge about the possibility of meaning, Hannah Ginsborg (2011a, 2011b) develops an account of meaning according to which a response is meaningful if, roughly put, it is accompanied by a normative attitude. Her notion of normativity, however, is quite minimal insofar as deeming a response *correct* or *appropriate* "does not depend on conformity with an antecedently recognized rule" (p. 233). While Ginsborg's main concern is to elucidate linguistic meaning, her notion of normativity is meant to shed light on concept possession more generally.<sup>5</sup> It is important to make clear that while Ginsborg does not commit herself to the claim that non-linguistic creatures have contentful states, there is nothing in her account that appears to exclude this possibility. Her account sheds light on the difference between "mechanical" responses and intentional ones, or, as she puts it, between "responding intelligently as opposed to reflexively or robotically" (2011a, pp. 170–171). According to Ginsborg, what distinguishes intelligent responses from the non-intelligent ones is what she calls "the consciousness of primitive normativity" (2011a, 2011b). That is, if a creature's response to the world is accompanied by a sense of the appropriateness of that response, the response deserves to be viewed as intentional and further, the creature can be said to be responding *meaningfully* or *with understanding*.<sup>6</sup> As she puts it,

We can make sense of...having a 'primitive' consciousness of the appropriateness of his response which does not depend on the antecedent grasp of a rule or standard determining that response as correct or incorrect, or even on the awareness that there is such a rule or standard. (Ginsborg, 2011b, p. 169)

<sup>5</sup> She writes, "[t]he phenomenon I am illustrating is not restricted to numerical examples, but pervades concept acquisition and language learning more generally" (2011b, p. 235).

<sup>6</sup> This does not entail, however, that any intentional response requires conscious deliberation. At least some intentional behavior is, arguably, automatic. The claim defended in this paper is merely that a creature can be said to belong to the intentional realm as soon as she has the sense of primitive appropriateness, which does require consciousness. This criterion, however, does not demand that every response of a full-blown intentional creature be conscious. We thank David Leavens for raising this question.



Ginsborg discusses the example of a child who is not yet in command of color concepts and who is asked to sort green objects. What does it take in order to see the child as sufficiently competent with this task for us to say that she has the concept of green? According to Ginsborg, “what seems to be needed, if her becoming competent in the activity of sorting green things is to amount to her ‘catching on’ to what green things have in common, is that, in acquiring that competence, she comes to see the green things as in some sense ‘belonging’ together” (2011a, p. 238). In other words, discriminating green from non-green is not sufficient; the child must perform the discrimination with the sense that the green objects *fit* or *belong* together or that they *ought* to be a part of the same pile. Once the child reaches this stage, if someone tosses a red object in her pile of green objects, she will have a sense of a lack of appropriateness characterizing the presence of the red object. However, given that she is not yet a language user, she will be unable to articulate the sense in which the action of tossing a red object in the pile lacks appropriateness. As Ginsborg makes it clear, the child does not view the move of including a red object as *incorrect* because she is not yet in possession of rules or concepts, which is to say that she cannot distinguish incorrect actions from actions to which the distinction between correctness and incorrectness does not apply. At this stage, which is tantamount to the very leap into the intentional realm, correctness or appropriateness is contrasted with lack of correctness or appropriateness, rather than with incorrectness or inappropriateness. The sense of appropriateness is, according to Ginsborg, precisely consciousness of primitive normativity.<sup>7</sup>

While Ginsborg seems to take the idea of taking one’s own responses to be appropriate as equivalent with the idea of having a sense that the objects in the sorted pile belong together, we will take the notion of primitive normativity to require that the sorting behavior be accompanied by the sense that the sorted objects fit or belong together (the idea of things *belonging* together being a normative one), without it necessarily being accompanied by the sense that one’s response to the pile of objects is appropriate. The reason is that the

<sup>7</sup> Furthermore, what the example of categorizing objects based on color shows, it seems to us, is that having the attitude of primitive normativity does not require prior experience nor encountered regularities; it is, at the very least, conceivable that a child senses that green objects *fit* together upon seeing the pile of objects for the very first time. Also, having the attitude of primitive normativity does not amount to understanding goal-directedness; the latter *does* seem to require prior experience. We thank Nathalie George for raising these questions.

taking of one's own responses to be appropriate may be something that requires metacognition, understood as the ability to have second-order mental states.<sup>8</sup> Ginsborg's account of normativity is minimal: in order to grasp the idea of correctness or appropriateness, one does not need to grasp rules. If she is right, the path to becoming a full-blown linguistic creature necessarily involves a stage at which one understands *oughts* without being able to articulate one's understanding. It is at this stage that the boundary between intentional and non-intentional creatures may be adequately drawn. This stage precedes the acquisition of language in humans and – more importantly for our aims – there is no *prima facie* reason to think that it does not characterize the cognitive evolution of other primates.

#### 4. Normativity without Language or Metacognition

The question we address now is that of whether empirical findings are consistent with Ginsborg's view. Before we examine existing data, it is worth emphasizing that Ginsborg's notion of primitive normativity is meant to supply “a condition of possibility of meaning and understanding” (2011a, p. 179) and that her account is nonreductionist, insofar as descriptions in purely physical terms, or what she calls “nonintentionally characterized regularities” cannot, in principle, offer a full account of intentional responses. Strictly speaking, one cannot devise a definitive empirical test for the presence of primitive normativity.<sup>9</sup> We could ask, however, if the claim that lies at the core of Ginsborg's account, namely that a creature may have a sense of appropriateness or correctness without an antecedent grasp of any norm, and without the awareness that norms might exist, appears to be consistent with empirical findings. Interestingly, research on the moral psychology of human children as well as other apes would seem to provide evidence that non-linguistic individuals are sensitive to normativity before they are able to pass standard false belief tasks.<sup>10</sup>

<sup>8</sup> See Andrews (2012) for an argument against the claim that metacognition is necessary for being an intentional creature.

<sup>9</sup> Due to the fact that mental state attribution essentially requires interpretation, this seems to present a problem for any experimental approach involving questions about mental states (consider experimental paradigms aiming to establish the presence of theory of mind in human infants, children, and apes).

<sup>10</sup> The received view is that children are not able to mindread until around age 4 (Wellman et al., 2001), though some studies with infants have suggested to some that humans can mindread at 15

While psychologists often speak of children's norm learning, their focus is less on the acquisition of normative concepts and more on the sense that there is a right way of doing things. We believe that this is consistent with Ginsborg's claim that, crudely put, primitive normativity does not require a grasp of explicit norms. At a very young age, children are already learning about how things ought to be done, or what is appropriate, without necessarily coming to grasp normative concepts or principles that they could use to justify or explain appropriateness. The growing data set on children's concern with correct behavior reflects what developmentalists, educators, and parents have long observed, namely that between 2 and 3 years of age, children become concerned with proper behavior, sometimes to the point of obsession (Rakoczy et al., 2008; 2009; Rakoczy, 2008). Furthermore, this concern seems to arise before anything like developed mindreading abilities emerge.

Evidence that even prelinguistic infants are sensitive to how one should behave comes from the seminal study done by Hamlin and colleagues (2007), which finds that as early as 6 months of age, infants begin to prefer some agents over others based on the agents' actions toward others. Using a violation of expectation paradigm and a reaching paradigm, researchers found that infants prefer a character that helps another actor to a character that hinders another actor. The authors conclude that even preverbal infants make normative assessments about others based on their actions. However, because we are dealing with prelinguistic infants that presumably lack sophisticated moral concepts (such as those that allow adults to distinguish between the just, the good, and the right), it is difficult to characterize the content of such assessments beyond a simple categorization into behavior that is correct and behavior that lacks correctness. Whatever the content turns out to be, it would seem that children use their ability to make such categorizations in order to form judgments about epistemic reliability. By 14 months of age, infants will more often follow a perceiver who had a prior reasonable response to a perception (e.g., looking excited when finding a toy in a container) as

months (Onishi & Baillargeon, 2005; Baillargeon et al., 2010). We are skeptical of those claims, and think that children are not fully-fledged mindreaders until long after they are able to pass standard false belief tasks (Andrews, 2012). This is not to deny that very young children have a social sense, that they are developing folk psychologists, or that they are sensitive to other's emotions and goals. Rather, the claim that young children are not mindreaders is the claim that they lack the metacognitive ability to consider beliefs and to attribute beliefs to others.

compared with a perceiver who did not (e.g., by acting excited when looking into a container that didn't hold a toy) (Chow et al., 2008).

Older pre-school children also show striking sensitivity to correct and incorrect behavior. Like infants, they are quite choosy about whom they learn from. For example, children preferentially learn from prestigious individuals, prestigious individuals being defined as those who get more attention from bystanders (Henrich & Gil-White, 2001). In another study, researchers found that 3- and 4-year-old children preferentially learn about artifacts from a person «to whom other learners have preferentially attended or deferred» (Chudek et al., 2012, p. 47). Children first watch a clip in which bystanders pay attention to the one model (the prestige model) and not to the other in either an artifact or food condition. Next, the subjects see the two models manipulate the same novel artifact by using different tools, or eating or drinking two different novel foods or beverages. Finally, when the children are asked to choose which models' behavior to imitate, around 70% of the subjects choose the prestigious model so long as the behavior is in the same domain in which the children were given the prestige cue; children do not generalize prestige across contexts.

Young children are quite good at distinguishing other contexts in which a demonstrator is reliable. When an adult demonstrator acts as though she knows how to use an object, 3-year-old children object strenuously when they see a puppet manipulate the object in a different way. But when the adult demonstrator acts as though she is unfamiliar with the object and invents a way of manipulating it, children do not object when the puppet later engages differently with the object (Schmidt et al., 2010). This study suggests that children are sensitive to normative contexts and that they are strong enforcers of "proper" behavior. Moreover, the adult demonstrator does not use normative language in either of the two conditions; the only thing that children could react to, it would seem, is "the expression of an attitude" (Schmidt et al., 2010, p. 6). As such, when discussing the results of the experiment, the authors write that "it does not seem to be the case that young children need actions to be explicitly marked normatively, with a normative language, to identify them as normatively governed, nor do they need them to have conventional labels" (*ibid.*). Children, it seems, are capable of having normative reactions in the absence of linguistic expression.

When it comes to understanding of normativity in apes, there is significantly less in the way of evidence. As far as we know, no experimental research along the lines of the infant studies described above has been done.

There are, however, some ethological data showing that chimpanzees have standards of behavior. In a recent paper, Rudolf von Rohr and colleagues discuss ample evidence from the field concerning the special status of infants in chimpanzee communities. Newborns are objects of great attention, and adult chimpanzees will observe the infants, but not approach or touch them. On the other hand, juveniles and older infants will try to approach or touch the new infant; this leads the mother to respond defensively. Thus, young chimpanzees quickly learn that infants should be left alone. Later, when an infant is old enough to venture away from his mother, adults are lenient toward him. Adults are extremely tolerant of infants climbing over them and even stealing their food or tools and they self-handicap when playing with infants. Furthermore, incidents of infanticide seem to trigger “massive reactions from male as well as female bystanders, including vocal protests such as ‘waa’ barking, persistent screaming, highly aroused individuals and even risky behaviour such as interventions and/or coalitionary defence of the mother-infant pair” (Rudolf van Rohr et al., 2011, p. 14). This leads the authors to think that chimpanzees might form “social expectations about the way in which others should be treated and react accordingly upon their violation,” and that they might possess “proto social norms” (Rudolf van Rohr et al., 2011, p. 20). In another study, Rudolf van Rohr and colleagues present and discuss findings related to the presence of policing, understood as «impartial interventions by third parties in ongoing conflicts» (2012, p. 1), in groups of chimpanzees and hypothesize that policing may count as evidence of a “community concern,” which can be seen as a precursor of social norms.

Another way of looking at this evidence is by taking it as an indication that chimpanzees may have a sense of what ought to be done, and that they possess something along the lines of Ginsborg’s notion of primitive normativity. Further, the fact that prelinguistic humans who lack mindreading abilities show sensitivity to social norms demonstrates that neither language nor mindreading is necessary for categorizing things as appropriate or as lacking appropriateness. Insofar as such studies convincingly show that very young children and apes are sensitive to *oughts*, it would seem that the admission into the normative realm does not require the ability to justify or give reasons for action and, as such, it does not require mindreading and it does not require language. Despite the fact that infant humans and adult chimpanzees are unable to justify their actions, they are able to sort individuals into categories and to learn that some objects are for particular purposes as well as that only some

ways of acting are appropriate. These findings seem to support the claim that creatures that lack mindreading skills as well as linguistic abilities may nonetheless understand *oughts*.

### 5. Are Ape Pointing Signals Intentional?

We now turn to the question of whether apes' pointing gestures are intentional. Gestures are usually defined in terms of intentional bodily actions that are performed with the goal of expressing meaning (Kendon, 2004). But the question tackled here is precisely whether nonhuman bodily actions are intentional, or apt to express meaning. We already saw that Pika & Liebal (2012) take for granted that gestural communication is intentional. There is ample evidence that primates use bodily movements for functional communication, but are the gestures intentional in the more robust sense that we attempted to spell out? To answer this question, we need to examine more closely the contexts in which such gestures are used. In light of Ginsborg's account, we can ask whether the kind of responses expressed by the gestures meet the normativity constraint.

We know that there is individual variability in the repertoires of gestures among great apes (Call & Tomasello, 2007), flexible use of gestures derived from species-typical displays (Genty et al., 2009), multi-modal communicative combinations (Leavens et al., 2010; Pollick & de Waal, 2007; Tanner, Patterson, & Byrne, 1996), gestural sequences or phrases (Genty & Byrne, 2010; Tanner 2004), and negotiation or co-regulation within communicative interactions, including elaborations (Cartmill & Byrne, 2007; Leavens et al., 2005; 2010). We know that apes engage in various kinds of gesture, including pointing: standardized species or group specific gestures that are otherwise arbitrary or non-iconic (see Blake, 2004 for a review, e.g. McGrew and Tutin, 1978), iconic gestures in which the referent resembles the gesture (Bates et al., 1975; Tanner et al., 2006, Tanner & Byrne, 1996), and pantomime, which involves more elaborate acting out of desired ends in an idiosyncratic way (Russon & Andrews, 2011a; 2011b). Pointing, iconic gestures, and pantomime may be important keys to understanding great apes' gestures given their remarkable motor flexibility and the opportunities we have for observing their production and comprehension. What kind of evidence would be required in order to count these behaviors as intentional in light of Ginsborg's criterion?

Famously, Call and colleagues found that chimpanzees engaged in more knocking, poking, and pushing when humans were unwilling to give them food as compared with humans who were merely unable to supply the food, suggesting that apes track a difference between intentional and unintentional action (Call et al., 2004). However, following Ginsborg's requirement for intentionality, we need to know more about the quality of the behavioral responses in order to determine whether the chimpanzees perceived the experimenter as violating an *ought*. In one condition of Call and colleagues' experiment, the experimenter was unable to offer a grape because the grape was out of the experimenter's sight. The chimpanzees engaged in fewer behaviors in this condition, thereby suggesting that they understood that the experimenter wasn't able to supply the food under those circumstances. But what was not coded is whether the chimpanzees attempted to attract the experimenter's attention, regardless of the way in which the criterion might be operationalized. For example, we don't know whether the chimpanzees pointed, and we don't know how they responded to points that were not followed.

We suggest that there are, at the very least, two very promising lines of empirical investigation. Both of them are based on the thought that, in the empirical evidence that we gather, we should look for indications of expectations regarding what *should* follow the gestures. The first promising approach follows the strategy of Leavens et al., (2005, 2010) and Cartmill & Byrne (2007) and focuses on elaborations of communicative signals in the face of misunderstandings. We know that children elaborate when their original message did not result in the appropriate response and they do so both verbally and gesturally from the time they begin to use words (Callaghan, 1977; Wilcox & Webster, 1980; Wilcox & Howse, 1982). Cartmill & Byrne (2007) found that captive orangutans continue to gesture until they receive the requested food, but that they vary the types of gestures depending on the response of the caretaker. If the orangutans only receive part of the food they request, they will repeat the original gesture. However, if the caretaker engages in an incorrect behavior, such as bringing the wrong food, the orangutans change their gesture, or elaborate on the original one.

Elaborations, repetitions, and substitutions of gestures are all examples of behaviors that indicate recognition of error. Using such gestures appropriately in the face of a failed message suggests that the gesturing individual is aware that something didn't work the way it should; if the animal responded to the

inappropriate reaction by taking it to be an instance of unfulfilled desire rather than an instance of error, we would expect the kind of protesting gestures that apes provided in the Call et al., (2004) study. By elaborating on a gesture in the face of an unfulfilled desire, the individual seems to understand that the caregiver is willing and able, but simply misguided. When a message is sent and the communicative partner does not respond as she *ought* to – as one typically does in that context – the expected response for an individual with primitive normativity is to see the noncompliance as lacking appropriateness. Elaborations in terms of either giving the same signal with more vigor or changing the signal, along the lines that Leavens et al., (2005) also advocate, constitute, it seems to us, evidence of primitive normativity. By changing the signal, the communicator is indicating that the appropriate response to the signal has not been given. Thus, it would seem that the research on elaborations in the face of failed messages touches upon the kind of normativity that Ginsborg takes to be the mark of intentionality. Further data on apes' responses to communicative partners' inappropriate use of symbols could help to accumulate further evidence in favor of ape intentionality when it comes to gestures such as pointing. For example, following Wittgenstein's remark<sup>11</sup> about points being followed backwards, one test may be to introduce a naïve individual into a pointing community who uses points backwards. We might examine whether other individuals protest at the incorrect use of the point.<sup>12</sup>

While the variety of the kinds of elaborations that apes are able to engage in belies this explanation (see, e.g., Russon & Andrews, 2011a), skeptics may object that elaborations in such contexts reflect prior reinforcement patterns and the change in response is a result of a weakening of the association, which is not reinforced. Furthermore, since we are particularly interested in an individual's recognizing that her own actions are constrained by *oughts*, we will also want to determine whether the subjects have reactions towards their own

<sup>11</sup> Wittgenstein gives the example of a person to whom it comes naturally “to react to the gesture of pointing with the hand by looking in the direction from fingertip to wrist, rather than from wrist to fingertip” (1953, §185).

<sup>12</sup> Based on discussions with primatologists, it would seem that apes rarely protest when it comes to other instances of communicative behavior, such as incorrect sign language use, so it seems unlikely that we witness protests when it comes to incorrect pointing. We think, however, that there may be other ways of determining whether apes are sensitive to the lack of appropriateness of a gesture. For example, scientists could perhaps measure stress levels in apes faced with the situation in which a conspecific uses pointing gestures incorrectly. Another suggestion, for which we thank Nathalie George, is that scientists measure the rewarding value of adequate pointing.



failed messages, and not just to failed responses on the part of the communicative partner. In order to bolster the claim that elaborations in the face of an unsatisfied request are intentional under Ginsborg's criterion, we must look for additional evidence. Recall that Ginsborg offers the example of a child sorting green objects. Presumably, when a red block is placed in a green pile, the child will have a sense of a lack of appropriateness that she will be unable to articulate. We suggest that if we are able to find a similar response in apes' incorrect pointing gestures, we will acquire evidence that such points are intentional and have referential content. For example, if apes could be trained to point for an ape partner to indicate the location of food, but the apes were trained using different gestures, the apes' responses to what they take to be "improper" gestures could be examined.<sup>13</sup> Given the difficulty apes seem to have with cooperative tasks, however, this proposal may not work. Perhaps the proposal may be successfully worked out with bonobos, who have been reported to share food (Hare & Kwetuenda, 2010), or with pairs observed to cooperate, such as bonded rehabilitant orangutans or mother-child pairs. Just as the quality of relationships between researcher and subject is important in generating reliable data on ape cognition (Vitale, 2011), the quality of the relationship between cooperating pairs is an important variable to consider.

The first challenge is to set up a situation in which an ape subject herself makes a pointing error that she quickly becomes aware of, or in which she observes another individual making a pointing error. The second challenge is to operationalize Ginsborg's notion of inappropriateness. To do so with children, psychologists would use qualitative judgments about the child's mental state in such contexts. We think that qualitative data is precisely what is required in order to get the ape research off the ground. Folk experts who know the species well and who do not know the research question can be used to code subjects' responses to errors (Andrews, 2009; 2011). Paradigms used with human infants, such as violation of expectation and preferential looking paradigms, have been used to examine the expectations of human infants (and some nonhuman species). Skeptics will perhaps be worried about the reliance on qualitative data, but we believe that the independence of the coders together with the corroborative findings on elaborations should help to temper such worries. Further, skeptics need to realize that such research has a partner in guilt, namely human infant and child psychology, where, for example, violation

<sup>13</sup> Thanks to Richard Moore for this suggestion.

of expectation studies are based on lay experts' opinions about when infants are surprised.<sup>14</sup> If we were to find that apes' qualitative responses to incorrect points are different in kind from their responses in other situations (for example, situations in which they fail to get food), and that the response occurs before the researcher reveals the correct answer, we would have evidence that the ape relies on correctness conditions for pointing. This leads us to the final point we aim to address in the paper, namely, the question of what the contents of the points are.

## 6. What Are the Contents of Ape's Points?

Given the assumption that some ape behavior is plausibly interpreted as involving a sense of primitive normativity, let us examine a popular theory about the nature of pointing gestures in apes. Tomasello (2008) claims that apes' pointing results from a social intention that someone else does something, so pointing in apes is only imperative, not declarative.<sup>15</sup> This is in contrast with children's tendency to use pointing declaratively at an early age. This difference, Tomasello claims, reflects large cultural differences between humans and the other apes: while humans are cooperative and tend toward wanting to share information, resources, and work, the other apes fail to have such cooperative impulses.

We think that a greater attention to the intentional realm as delimited by the presence of primitive normativity can be used to, at the very least, cast some doubt on Tomasello's view. For Tomasello, ape pointing is an instance of what he calls *attention-getting gestures*; more specifically, Tomasello claims that

<sup>14</sup> Consider tasks in which infants are presented with a stimulus that is shown to them again and again until they get bored. We supposedly know that the infant is bored because she stops looking at the stimulus, but this is just a folk psychological interpretation of behavior. In the next phase the infant is shown a new stimulus, and if she looks longer at it, researchers supposedly know that the new stimulus is perceived as different – the second folk psychological interpretation. If the infant doesn't look longer at the new stimulus, then researchers supposedly know that the stimulus is the same to the infant – yet a third interpretative move. The researchers are just measuring looking time, and looking time is only interesting if it shows something. By interpreting looking time as interest or surprise, the researchers draw conclusions about infant cognition. But there is no independent confirmation of this interpretation – it is the starting position that is needed to get research off the ground. Without the ability to make such assumptions, we would have no means for engaging in infant cognition research.

<sup>15</sup> This distinction has been made by Bates et al., (1975) in their work on preverbal communication in human children. Gestures and speech can be said to be either imperative if they function as requests or declarative if they function as attempts to share information about the world.

many apes learn how to point during their interactions with human beings in a way that makes pointing “a powerful extension of their natural attention-getting gestures” (2008, p. 34). What is characteristic of attention-getting gestures is that, “the communicator has some action he wants from the recipient – what we may call his *social intention* – and to attain this he attempts to draw the recipient’s attention to something ... in the expectation that if she looks where he wishes, she will do as he wishes” (2008, p. 29). Tomasello motivates this view by claiming that, on the one hand, apes’ pointing gestures are expressions of requests, and, on the other hand, apes don’t seem to comprehend points when the latter are made declaratively; they seem to comprehend only imperative pointing. What this entails is that, in the case of non-human apes, the content of the point is, in a sense, limited to another ape’s behavior. Therefore, it is safe to claim that for Tomasello there seems to be a gap between human pointing, which is genuinely referential, and ape pointing, which is not.<sup>16</sup>

However, while the phenomenon of sharing information has not been systematically addressed, some field researchers do speak of cases of in which apes share information. Rehabilitant orangutans, for example, have been observed to show caregivers fruits by presenting them on their extended lower lip; the caregivers are allowed to examine the fruits, but if they fail to return them, the orangutans will often become agitated (Andrews, unpublished data). In pantomime communication episodes, orangutans have been observed to share information with a communicative partner. In one instance, an infant orangutan named Kikan was observed by a field assistant, Agnes, to be mouthing her foot. When Agnes investigated, she noticed a stone embedded in Kikan’s foot, so she picked out the stone with a pencil, and then dabbed the wound with some latex from a leaf. Days later, Kikan grabbed Agnes’s arm, and when she turned to look Kikan held out her foot, picked a leaf and dabbed it with the stem, just as Agnes had done to close the wound. When Agnes looked closely, she saw that the wound had healed. Then Kikan walked away (Russon & Andrews, 2011b). Because there was no functional interpretation of this behavior, it was interpreted as sharing information by letting Agnes know that her doctoring had worked.

<sup>16</sup> When Tomasello refers to the referentiality of gestures, he uses scare quotes, and motivates his choice by saying that “what apes are doing is a precursor to human reference while differing in some respects” (2008, p. 29).

Tomasello is skeptical of such interpretations, claiming that the behaviors may be accidents, and that only systematic experimental work can determine whether an orangutan desires to share attention or to inform. We think that by establishing normativity in the context of ape pointing, we would also establish that there is no robust difference between the points of apes and those of human children; the way in which pointing gestures are used becomes less relevant. Empirical evidence that apes understand *appropriateness* when it comes to pointing would show that there is more to it than a mere extension of their natural attention-getting gestures, which lack genuine referentiality. Understanding correctness or appropriateness requires more than “the communicator’s social intention that the recipient *see* something, which he expects, based on his intentional understanding (in combination with past experience), will most likely lead her to *do* what he wants” (Tomasello, 2008, p. 50). It is, rather, an understanding that this is how things *should* go. So, even if apes generally use points to request objects, their awareness that there is a right way to request objects would suggest that their points are referential rather than merely procedural. The reference need not be the object pointed at, but may be the proper behavior associated with the request. As such, there may be no difference in kind between the pointing gestures of human infants and those of other apes.

## 7. Conclusion

Rather than seeing ape pointing as some kind of truncated reaching, we suggest that pointing should be viewed as a rich signal involving a basic understanding of the way things *ought* to be done and not just of how things are done. By relying on Ginsborg’s criterion for intentionality, researchers can develop additional tasks to examine the existence of primitive normativity in pointing and other ape gestures.

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